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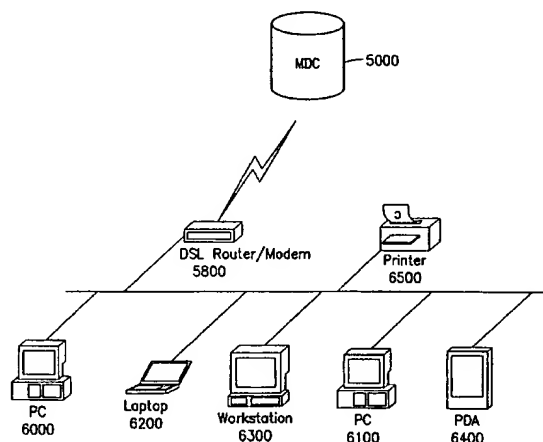
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(54) Title: A MEDICAL DIAGNOSIS AND PRESCRIPTION COMMUNICATIONS DELIVERY SYSTEM, METHOD AND APPARATUS



(57) Abstract: The new and improved medical diagnosis and prescription communications delivery system, method and apparatus connects referring physicians to their diagnostic service centers and Media Distribution Center (5900) for handling patient, diagnostic and pharmaceutical information. Patient information, including a preliminary diagnosis by the referring physician, is transmitted to a diagnostic service center and the diagnostic service center transmits a patient's diagnosis test results to the Media Distribution Center (5900) communicates, "real-time", the results of the patient's diagnosis and recommended pharmaceutical treatments back to the referring physician. The diagnosis triggers complementing pharmaceutical options for the referring physician to select or research through the Media Distribution Center (5900) which provides state-of-the-art information on each pharmaceutical option with clinical information available to assist in the selection of a pharmaceutical treatment. The Media Distribution Center (5900) maintains a record of an entire patient encounter and diagnosis, including the physician's prescription.



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## **A MEDICAL DIAGNOSIS AND PRESCRIPTION COMMUNICATIONS DELIVERY SYSTEM, METHOD AND APPARATUS**

### **Field Of The Invention**

This invention pertains to a communications system, method and apparatus for delivering a diagnosis and accompanying pharmaceutical suggestion(s) and/or treatment(s) to a physician to facilitate a course of medical treatment for a patient.

### **Background Of The Invention**

The internet has provided physicians with the capability for improved communication to enhance their physician-to-physician relationships or their patient-to-physician relationships or their vendor-to-physician relationships. Effective communication between physicians, patients and vendors improves the quality of care that a physician can provide a patient. Many healthcare organizations and services now provide a physician with access on-line to a patient's diagnosis test results. A physician can also access on-line information pertaining to an appropriate treatment for a particular diagnosis. However, none of the current healthcare organizations and services simultaneously provide a physician with the results of a patient's diagnosis and a corresponding vast resource of recommended treatments and/or pharmaceutical options.

In the current healthcare delivery and information management systems, the physician receives a patient's diagnosis results and then must separately research a course of medical treatment for the patient. In this scenario, the physician has to spend a great deal of time researching a particular treatment and/or pharmaceutical option, including any current, new or innovative drug treatments; down time that the physician cannot afford in view of the large number of patients requiring daily treatment and care.

Most healthcare organizations and services also have any number of disparate information systems managing different segments of their healthcare business. These core operational systems manage healthcare-related affairs on a daily basis. These systems are neither capable of storing huge quantities of historical

patient data nor are they structured to support in-depth decision support queries. After any patient care encounter has passed, the collected data has only historical importance. Without a way to conserve and consolidate such data, it is relegated to the archives. For the most part, the data becomes inaccessible after a set number of days or upon the patient's discharge. Such healthcare systems do not currently have a mechanism to combine this data and transform it into important information that can be analyzed by hospital administrators, clinicians and researchers, as well as insurance and pharmaceutical companies.

### **Objects And Advantages Of The Invention**

It is an object of the invention to connect referring physicians and diagnostic service centers through a virtual private network and create a Media Distribution Center for managing patient information. A diagnostic service center communicates a patient's diagnosis and/or images to the Media Distribution Center which in turn communicates "real-time" to a physician the diagnosis test results (including images such as X-rays, MRI scans, CAT scans, etc. . .) together with pharmaceutical treatment options for the physician to select or research. The data warehouse of the Media Distribution Center provides state-of-the-art information on each pharmaceutical option with clinical information available to assist in the pharmaceutical selection. This data is provided directly from pharmaceutical companies and other highly reliable medical facilities. Hospitals and other medical facilities, as well as insurance companies, can monitor a patient's case on a "real-time" basis, too.

The invention provides referring physicians with detailed pharmaceutical information for each specific encounter and diagnosis. In this scenario, the physician no longer has to spend a great deal of time researching new and innovative pharmaceutical treatments. The Media Distribution Center provides physicians with a quick and effective research tool for providing the best and most current treatments available for a variety of illnesses. The invention provides physicians with highly detailed information generated from data collected from the specific encounter that they are treating. This data streamlines the research process because it is encounter and diagnosis specific.

Another object of the invention is to have a Media Distribution Center

containing data warehouse full of state-of-the-art information on illnesses, treatments, clinical data and prescribed pharmaceuticals accessible to physicians and medical facilities. Through the Media Distribution Center, the invention creates a communication network among physicians, diagnostic service centers and other medical facilities and a repository of information for reporting and statistical analysis. The invention provides effective (immediate) communication among physicians and allows for supporting industries (pharmaceutical companies, manufacturers, insurance companies, and pharmacies) to benefit by having targeted information on patient care and physician's preferences.

The benefits that the invention provides by warehousing medical and clinical data and making such data available on a "real-time" basis are numerous. These benefits include more effective case, disease and cost management, easier access to data on an *ad hoc* basis, and more effective treatment analysis. The invention allows patient encounter and diagnoses to be readily analyzed by hospital administrators, clinicians and researchers as well as insurance and pharmaceutical companies.

Another benefit that the invention provides is that for each patient it maintains data on an entire encounter, including treatment and prescription data. This allows clinicians to manage patients more effectively, by, for example, showing them the prescription and whether or not all refills were fulfilled.

The invention further facilitates online physician communication for enhanced patient care. By facilitating access and presentation of "real-time" diagnoses and their current suggested pharmaceutical treatments, the invention will render out-dated standards of data and image retrieval obsolete. It further provides medical staff the freedom from relying on historical healthcare data to real-time access of the information that physicians and their patients require.

The foregoing specific objects and advantages of the invention are illustrative of those which can be achieved by the present invention and are not intended to be exhaustive or limiting of the possible advantages which can be realized. Thus, these and other objects and advantages of the invention will be apparent from the description herein or can be learned from practicing the invention, both as embodied herein or as modified in view of any variations which may be apparent to those skilled in the art. Accordingly, the present invention resides in the

novel parts, constructions, arrangements, methods, systems, combinations and improvements herein shown and described.

### **Summary Of The Invention**

The above-mentioned and other objects and advantages of the invention are met by a new and improved medical diagnosis and prescription communications delivery system, method and apparatus. The method and system of the invention connects referring physicians to their diagnostic service centers and Media Distribution Center for handling patient, diagnostic and pharmaceutical information. Patient information, including a preliminary diagnosis by the referring physician, is communicated to a diagnostic service center and the diagnostic center transmits a patient's diagnosis test results to the Media Distribution Center.

The Media Distribution Center communicates, "real-time," the results of the patient's diagnosis and recommended pharmaceutical treatments back to the referring physician. The diagnosis triggers complimenting pharmaceutical options for the referring physician to select or research through the Media Distribution Center which provides state-of-the-art information on each pharmaceutical option with clinical information available to assist in the selection of a pharmaceutical treatment.

The Media Distribution Center of the invention monitors and maintains a record of an entire patient encounter and diagnosis, including the physician's prescription. Consequently, each patient record can be readily analyzed by hospital administrators, clinicians and researchers as well as other supporting industries such as insurance companies.

The invention is also directed to a computer apparatus for selecting recommended pharmaceutical treatments corresponding to a coded diagnosis for each patient encounter as well as for displaying the diagnosis and pharmaceutical options to a physician. The invention can display a patient's diagnosis and recommended pharmaceutical treatments to a physician in a single web page, thereby streamlining the physicians research for a proper pharmaceutical treatment.

The invention is further directed to a computer device for transmitting a coded diagnosis to the Media Distribution Center which then selects recommended pharmaceutical treatments corresponding to the coded diagnosis based on a lookup of the pharmaceutical treatment information stored in a warehouse database. Real-

time diagnosis information, including images such as X-rays, MRI scans, CAT scans, etc. . . , are then transmitted to a physician together with the recommended pharmaceutical treatments.

The invention also is directed to a computer readable medium having computer executable software code stored thereon for selecting recommended pharmaceutical treatments corresponding to a coded diagnosis for each patient encounter as well as for displaying the diagnosis and pharmaceutical options to a physician.

### **Brief Description Of The Drawings**

The above and other objects, features and advantages of the invention will be apparent from the following detailed descriptions especially when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is an exemplary flowchart of an initial patient/physician encounter which describes the process a physician goes through to make a final diagnosis and medical prescription.

FIG. 2 is an exemplary flowchart of a Radiology Services Process which shows how diagnosis data and images are acquired by the Media Distribution Center of the invention.

FIG. 3 is an exemplary flowchart of a Radiology Results Analysis which shows the process of the invention that a referring physician follows after confirmation is sent from the Media Distribution Center that radiology services for a particular patient encounter have been completed.

FIGS. 4A and 4B are exemplary web pages displayed as of January 24, 2000 on the MedeView.Com web server of the invention depicting an example of a radiologist's diagnosis and X-ray image results together with accompanying recommended pharmaceutical treatments for a specific patient encounter.

FIG. 5 is an exemplary flowchart which shows the process of the invention that a physician follows where radiology services are not necessary but medication is prescribed for treatment.

FIG. 6 is an exemplary flowchart of the overall medical diagnosis and prescription communications delivery system of the invention.

FIG. 7 is an exemplary schematic of a referring physician's network

utilizing the invention.

FIG. 8A is an exemplary schematic of a radiologist's network utilizing the invention.

FIG. 8B is an exemplary schematic of a radiologist's network utilizing the invention which does not include a PACS system.

FIG. 8C is an exemplary schematic of a radiologist's network utilizing the invention which includes a PACS system.

FIG. 8D is an exemplary schematic of the extraction of a radiologist's report from an HIS/RIS system.

FIG. 9 is a schematic exemplifying the broad geographic scope of the network of the invention.

It will be appreciated by those skilled in the art that the foregoing brief description and the following detailed description are exemplary and explanatory of the invention, but are not intended to be restrictive thereof or limiting of the advantages which can be achieved by the invention. Thus, the accompanying drawings, referred to herein and constituting a part hereof, illustrate preferred embodiments of the invention and, together with the detailed description, serve to explain the principles of the invention.

### **Detailed Description Of The Embodiments**

The medical diagnosis and prescription communications delivery system, method and apparatus of the invention connects referring physicians to their diagnostic service centers and creates a Media Distribution Center for handling patient, diagnostic and pharmaceutical information. Patient encounter information is passed to a diagnostic service center and the diagnostic service center transmits a patient's diagnosis and images to the Media Distribution Center. The Media Distribution Center communicates "real-time" the results of the patient's diagnosis and images as well as accompanying pharmaceutical options back to the referring physician. The diagnosis triggers complimenting pharmaceutical options for the referring physician to select or research which are readily accessible through the Media Distribution Center. The Media Distribution Center data warehouse provides state-of-the-art information on each pharmaceutical option with clinical information available to assist in the selection of a pharmaceutical treatment.

The Media Distribution Center data warehouse is a data storage repository for illnesses, treatments and drugs. The Internet brings healthcare information from physicians and medical facilities into the Media Distribution Center, where the invention creates a communication link among physicians for medical reporting and statistical analysis. The invention provides effective and immediate communication among physicians and allows for supporting industries (hospitals, pharmaceutical companies, manufacturers, insurance companies, and pharmacies) to benefit by having targeted information on patient care and physicians' preferences.

#### **A. Initial Patient/Physician Encounter**

FIG. 1 is an exemplary flowchart of an initial patient/physician encounter showing the process a primary care physician undertakes to make a final diagnosis and prescribe medication. As shown in FIG. 1, a patient visits a physician (Step 100) and the physician makes a preliminary diagnosis (Step 200). FIG. 1 is based on the assumption that radiology services are the only external health service needed for this encounter. However, the invention can be modified to include any diagnostic service, including such services as ordering laboratory tests and/or specialist visits.

In this instance, the physician decides (Step 300) whether radiology services are needed before a final diagnosis is given. If radiology services are



required, the referring physician's office schedules an appointment with the radiology office (Step 400) which commences the radiology services process (Step 500). If radiology services are not required, the physician determines whether a pharmaceutical prescription is needed (Step 600). The physician accesses the pharmaceutical knowledge database of the Media Distribution Center of the invention for a recommended pharmaceutical prescription (Step 700). If a prescription is not needed, the physician recommends an alternative treatment, if necessary (Step 800).

**B. Diagnosis Testing Services Process**

The Radiology Services Process flowchart of FIG. 2 is an example of how radiology results, including data and images, are updated into the Media Distribution Center. A patient visits a radiology office based on a referral from the physician (Step 900). In Step 1000, modality images of the patient are taken. In a preferred embodiment, the images are stored in a Picture Archive and Communications System (PACS) (Step 1100). A PACS archiving system provides faster and more widely available access to images for viewing by the radiologist. PACS digital format stores images for an infinite time period. PACS permits images to be used by the referring physician, as well as, for case management and teaching aids.

In Step 1200, digital images from the PACS are interfaced with patient encounter and diagnosis information. The patient encounter and diagnosis information is received preferably in a High Level Seven (HL7) message. Health Level Seven is one of several ANSI-accredited Standards Developing Organizations (SDOs) operating in the healthcare arena. Most SDOs produce standards (sometimes called specifications and protocols) for a particular healthcare domain such as pharmacy, medical devices, imaging or insurance (claims processing) transactions. Health Level Seven's domain is clinical and administrative data.

The digital image data is preferably captured and stored via an industry standard called DICOM. ACR-NEMA DICOM is the standard storage and networking protocol for medical imaging. DICOM allows for the very high resolution rendering of medical imaging for diagnostic purposes. The high resolution and the closed nature of the protocol require dedicated viewing stations to manipulate the images. For the images to be presented in a web page, industry standard compression techniques can be used to make the images easily transportable with a minimal loss in

resolution.

The Radiologist reviews the patient's symptoms and radiology images (Step 1300), makes a diagnosis (Step 1400) and the diagnosis results, including the images, are delivered to the Media Distribution Center (Step 1500). The images and diagnosis information are preferably loaded into a database located in the Media Distribution Center.

In Step 1600, the referring physician is notified that the radiology services have been completed. This is preferably done via e-mail. The referring physician or a staff member can then access the radiologist's consultation notes, diagnosis and images from a customized web browser on a specified internet appliance or from an existing computer setup in Step 1700.

**C. Presentation Of Diagnosis Testing Services Results And Accompanying Pharmaceutical Options**

A unique aspect of the medical diagnosis and prescription electronic communications delivery system, method and apparatus occurs at the point where the referring physician determines whether or not medication is necessary for treatment. If medication is needed for treatment, the physician has immediate access to a vast state-of-the-art pharmaceutical and treatment knowledge database that is highly versatile in both scope and depth. This database is constantly updated to contain the most current pharmaceutical and treatment information available as well as supporting clinical information. The database provides physicians with a quick and effective research tool for providing the highest quality and most current treatments available.

In the current healthcare environment, available time is essential for primary care physicians to meet the demands of their patients in a given day. In view of the demands each day for patient care and treatment, physicians have limited available time to pursue their research on the current pharmaceuticals and treatments. Accordingly, the invention streamlines the research process for physicians by providing them with readily accessible and highly detailed pharmaceutical and treatment information, as well as supporting clinical information, for each specific patient encounter that they are treating.

As shown in FIG. 3, the referring physician receives notice (Step 1800) of the completion of the radiology services from the Media Distribution Center. The

referring physician accesses his/her web browser to retrieve patient diagnosis data and images from the Media Distribution Center (Step 1900). The Media Distribution Center processes the referring physician's request (Step 2000) and prepares the patient specific image, encounter and diagnosis information to be sent to the physician (Step 2100).

Next, the Media Distribution Center conducts a knowledge database lookup (Step 2200) to suggest pharmaceuticals and treatments based on the encounter and diagnosis data. Based on the diagnosis code (preferably an ICD9 code) given by the radiologist, a lookup is performed against the pharmaceutical knowledge database of the Media Distribution Center. The Media Distribution Center combines the image and encounter data with the pharmaceutical knowledge database results for presentation to the referring physician (Step 2300). The combined information is delivered to the referring physician (Step 2400).

In a preferred embodiment (FIG. 4A), the patient encounter, diagnosis and image data together with the accompanying pharmaceutical treatment options are presented to the referring physician or staff member in a single web page on the MedeView.Com web site. As shown in FIG. 4A, patient encounter information and an accompanying chest X-ray image are displayed under the heading "Current View." Together with background information on the patient, including his name, birth date, sex, social security number, the encounter number, date and accession number are listed. Directions for "Image Navigation" are provided so that a physician can review the X-ray image in further detail. The Radiologist Diagnosis and Notes appear below the X-ray image, including the ICD9 code(s). In this instance, the radiologist diagnosis impression is "Cardiomegaly and evidence of early CHF." The ICD9 codes displayed are "429.3 Cardiomegaly" and "428.0 Congestive Heart Failure." Related cardiology and CHF news are displayed adjacent the Radiologist Diagnosis and Notes and can be accessed by clicking on a hyper-link.

Accompanying the encounter information, X-ray image and Radiologist Diagnosis and Notes, "Appropriate Treatments" are displayed based on the Media Distribution Center lookup corresponding to the ICD9 Codes listed. In this instance, the suggested treatments are "Capoten", "Capozide", and "Monopril." Further information concerning each pharmaceutical option is readily accessible via hyper links in additional web pages. For example, by clicking on the hyper-link

corresponding to the "Monopril" treatment, more detailed information (as shown in FIG. 4B) concerning this treatment can be accessed, such as "Uses", "How to Use", "Side Effects", "Precautions", "Interactions", "Notes", "Missed Dose" and "Storage." The Media Distribution Center readily provides the physician with state-of-the-art information concerning each suggested treatment. The physician can return to the main page by clicking on a hyper-link.

As shown in FIG. 4A, "Research Topics" corresponding to the cardiology and CHF subjects of the radiologist diagnosis are also displayed and can be accessed by the physician. In this instance, the topics include "Congestive Heart Failure Guide", "Congestive Heart Failure in the United States: A New Epidemic", "Texas Medical Center Article on CHF" and "Boston University Article on CHF." The physician has easy access to other areas of the MedeView.Com web site through the "Main Menu."

The referring physician now has detailed pharmaceutical information specific to a patient encounter. This data is provided directly to the Media Distribution Center from pharmaceutical companies or other medical facilities. In this scenario, the referring physician no longer must spend a great deal of time researching new and innovative drug treatments; the pharmaceutical information is immediately presented to the physician specific to a patient encounter. If the referring physician makes a change to the diagnosis code, the Media Distribution Center performs another lookup against the pharmaceutical knowledge database and the referring physician is again presented with a list of corresponding pharmaceutical treatments.

The referring physician reviews the radiology results (Step 2500) and the pharmaceutical suggestions from the knowledge database (Step 2600). If the referring physician prescribes a suggested pharmaceutical treatment (Step 2700), an electronic prescription is printed for the physician (Step 2800) and patient (Step 2900) and/or electronically transferred to a participating pharmacy (Step 2800). Alternatively, the prescription (if not electronic) can be given to the patient for delivery to a pharmacy (Step 3000).

The data from the prescription is acquired for the database in the Media Distribution Center. At this point, the database can store at least the following information: (i) the demographic information on the patient; (ii) the demographic information on the physician, including their UPIN; (iii) the preliminary diagnosis; (iv)

the radiologist's diagnosis; (v) the referring physician's final diagnosis; (vi) the drug, if any, prescribed for treatment; and (vii) the amount of refills recommended.

Alternatively, if the referring physician does not prescribe a suggested pharmaceutical treatment (Step 2700), the referring physician completes an electronic prescription form (Step 2800). The prescription is printed for the physician, patient and/or electronically transferred to a participating pharmacy (Step 3200).

Alternatively, the prescription if not electronic can be given to the patient for delivery to a pharmacy (Step 3000). The prescription related data is delivered to the Media Distribution Center and added to the encounter record (Step 3300).

**D. Prescribing Treatment Where Diagnosis Testing Services Are Unnecessary**

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FIG. 5 represents an exemplary scenario according to the invention where diagnostic services, such as, for example, radiology services, are unnecessary but the referring physician prescribes medication to treat a patient. In Step 3400, the coded encounter and diagnosis data is delivered to the Media Distribution Center. The Media Distribution Center conducts a knowledge database lookup (Step 3500) to suggest pharmaceuticals based on the encounter and diagnosis data. The Media Distribution Center combines the encounter and diagnosis data with the knowledge database results for presentation (Step 3600) and delivers the information to the referring physician (Step 3700).

The referring physician reviews the suggested pharmaceuticals from the knowledge database (Step 3800) and decides whether to prescribe a suggested pharmaceutical (Step 3900). If the referring physician prescribes one or more of the suggested pharmaceuticals, an electronic prescription is printed and/or electronically transferred to the participating pharmacy (Step 4000). The prescription can alternatively be printed for patient education (Step 4100) or can be given (if not electronic) to the patient for delivery to a pharmacy (Step 4200).

If the referring physician does not prescribe a suggested pharmaceutical, the referring physician completes an electronic prescription form (Step 4300) and the prescription is printed and/or electronically transferred to a participating pharmacy (Step 4400). The prescription can be given (if not electronic) to the patient (Step 4200). The prescription is delivered to the Media Distribution Center (Step 4500) and added to the encounter record.

**E.     Operating The Medical Diagnosis And Prescription  
Communications Delivery System, Method And Apparatus**

FIG. 6 is an overview flow diagram of the medical diagnosis and prescription communications delivery system. As shown in FIG. 5, there are five basic components to the invention: (1) the referring physicians (Step 5300), (2) the diagnostic service centers (Step 4600); (3) the source for pharmaceutical and treatment data (Step 5200); (4) the Media Distribution Center (Step 5100); and (5) the decision support entities, such as pharmaceutical companies, insurance companies and hospital administrators, researchers and clinicians (Step 5700). The invention provides a virtual private network between referring physicians, diagnostic service centers, pharmaceutical companies and the decision support entities.

The following networking elements are utilized in the preferred embodiment of the invention. Ethernet is the preferred Local Area Network (LAN). Digital Subscriber Line technology (DSL), Asymmetric Digital Subscriber Line technology (ADSL) and/or Private Line technology are the preferred Wide Area Networks (WAN). However, it should be recognized that the invention is not limited to the preferred LAN and WAN networking systems and can be integrated into any network architecture suitable for the transmission of encounter, diagnostic, imaging, pharmaceutical and other medical treatment data and information.

Ethernet is a common LAN technology in use today. Ethernet provides a good balance between speed, cost and ease of installation suitable for use in the invention. As for the WAN technology, DSL offers a variety of speeds ranging from 32 Kb/s (Kilobits per second) to more than 50 Mb/s (Megabits per second). ADSL is a commonly used form of DSL technology. In the ADSL system, the upstream and downstream bandwidth is typically asymmetric, or uneven, and the bandwidth from the provider to the user (downstream) is typically the higher speed path. Downstream speeds typically range from 1.5 Mbps to 9 Mbps; upstream speeds typically range from 64 Kbps to 1.5 Mbps.

A private line circuit is basically a dedicated non-switched link between customer end points. This dedicated network connection provides a fixed amount of bandwidth between the connected locations. Private Lines offer the opportunity to integrate multiple communications functions onto a single line with timely, secure transmissions. Private line circuits are preferably available in the following sizes:

DS-O	A 56/64 Kb circuit used for digital data and dedicated voice services (24DS-O circuits make up one DS-1 circuit).
Fractional DS-1/T-1 Circuits	Handles bandwidth requirements at any level between 56 Kbps and full T-1 (1.544 Mbps).
DS-1/T-1 Circuits	High capacity circuits at 1.544 Mbps (or 24 x 64 Kbps segments).
DS-3/T-3 Circuits	Super-capacity circuits at 45 Mbps (28 DS-1 circuits).

In the preferred embodiment, the referring physician (Step 5300) utilizes a DSL or Private Line circuit to connect to the Media Distribution Center of the invention. The referring physician and his/her staff can thereby retrieve patient encounter, diagnosis data and images from the Media Distribution Center and use the Internet simultaneously. The physician application (Step 5400) includes notification that the patient's diagnostic results are ready and presentation of the diagnostic results and/or images with accompanying pharmaceutical recommendations. Since the application is based on standard Internet applications, a variety of means can be utilized to access the data from the Media Distribution Center. Off the shelf personal computers, combined with an Ethernet card, Macintosh computers, dedicated workstations, and even PDAs such as the palm pilot are some examples of the equipment that can be connected to the Media Distribution Center.

Once the diagnostic data and/or images together with the pharmaceutical recommendations are presented to the physician, e.g., on a web page viewed on the physician's personal computer, a hard copy of the data or image can be printed and kept in the patient's file. If the referring physician chooses a recommended pharmaceutical treatment or any other treatment, the prescription for that treatment can be printed for the patient's file. The diagnosis activities of the physician and the prescription can also be communicated (Step 5500) to the Media Distribution Center for further record keeping or to a decision support entity such as a hospital administrator, researcher or clinician for further analysis (Steps 5600-5700).

A referring physician's network is exemplified in FIG. 7. As shown in FIG. 7, a DSL router/modem (5800) is utilized to connect to the Media Distribution Center (5900) of the invention. The data from the Media Distribution Center can be

accessed by a PC (6000 and 6100), Laptop (6200), Workstation (6300) or PDA (6400) and printed on an accompanying printer (6500).

The invention provides the referring physician and his/her staff with readily accessible diagnostic and pharmaceutical information at the highest level of reliability. The physician has high speed access to the diagnostic and pharmaceutical information for each patient encounter for downloading or further analysis and research. The invention can further be integrated into the existing network previously installed at a referring physician's office and permits the physician to utilize the internet while using the network of the invention.

Referring again to the preferred embodiment of the invention shown in FIG. 6, the network for the diagnostic service center, in this case a radiologist (Step 4600), utilizes a Private Line circuit connection to the Media Distribution Center of the invention. This allows the radiologist to submit large amounts of diagnostic data (Step 4700) and/or images (Step 4800) to the medical imaging server (Step 4900) for acquisition (Step 5000) by the Media Distribution Center (Step 5100).

An exemplary network for the radiologist is shown in FIG. 8A. The network includes a Private Line circuit connection (6600) to the Media Distribution Center (6700), and a DICOM to web gateway (6800) for extracting information from the radiologist's X-ray machine (6900), HIS/RIS System (7000), workstation (7100) and/or PACS Archive (7200) and delivering the information to the Media Distribution Center. The diagnostic information and images can be printed on the accompanying printer (7200).

As shown in FIG. 8B, if the radiologist does not have a PACS system, the x-ray machine (7300) (if DICOM capable) can be configured to send the image to the viewing workstation (7400) and the DICOM to web gateway (7500). The gateway then sends the images to the Media Distribution Center (7600).

As shown in FIG. 8C, if the radiologist already has an X-ray machine (7700) and PACS system (7800), the PACS archiver can be configured to send the image to the DICOM to web gateway (7900) and the viewing workstation (8000). The gateway then sends the images to the Media Distribution Center (8100).

FIG. 8D shows that the radiologist's report can be extracted from the HIS/RIS system (8200) by the DICOM to web gateway (8300) and entered directly into a web-based application at the Media Distribution Center (8400).



The invention provides high speed access for the submission of highly reliable diagnostic data and images. The invention can be integrated into any existing network architecture previously installed at a radiologist or diagnostic service center, and allows the radiologist and his/her staff to utilize the Internet while using the invention.

Referring again to FIG. 6, the Media Distribution Center (Step 5100) collects and transforms large amounts of data to create information that can be analyzed. The Media Distribution Center collects data and information from four primary sources: (1) diagnostic service centers (Steps 4600-5000); (2) referring physicians (Steps 5300-5500); (3) a source for pharmaceutical and treatment data (Step 5200); and (4) decision support entities, such as pharmaceutical companies, insurance companies and hospital administrators, researchers and clinicians (Steps 5600-5700). Functionally, the Media Distribution Center integrates operational and historical medical data from these sources and preserves it. The data is transformed into information that can be analyzed by hospital administrators, researchers and clinicians as well as pharmaceutical and insurance companies (Steps 5600-5700). The data can also be presented in a manner that enables physicians to not only readily obtain the diagnostic data and images for each patient encounter but also the recommended pharmaceutical treatments for each such patient.

The Media Distribution Center comprises three principle components: (1) web servers; (2) DICOM to web gateway; and (3) the data warehouse. The web servers store the physician applications (Step 5400) and decision support applications (Step 5600) and present data stored in the data warehouse (e.g., patient diagnosis data and images together with recommended pharmaceutical treatments) to the referring physicians using an Internet browser, such as, for example, Microsoft Internet Explorer or Netscape Communicator. The servers are based on common network operating systems, and are scalable to ensure acceptable response time.

ACR-NEMA DICOM is a standard storage and networking protocol for medical imaging. DICOM allows for the very high resolution rendering of medical imaging for diagnostic purposes. The high resolution and the closed nature of the protocol require dedicated viewing stations to manipulate the images. For the images to be presented in a web page, industry standard compression techniques can be used to make the images easily transportable with a minimal loss in resolution. The

images are then stored in the data warehouse for viewing and archiving. The original DICOM image can also be archived or sent to the PACS system, if such a system is installed in the radiologist's office.

The data warehouse is comprised of a collection of data processing servers and network attached storage servers. The data processing servers receive the queries from the applications residing on the web servers and process the data residing on the storage servers. Functionally, the data warehouse integrates operational and historical data from multiple, disparate data sources and preserves such data. By joining these scattered data fragments, users can employ the stored data for decision making, for clinical and administrative decision making and, ultimately for the well being of patients and the medical institution.

The data warehouse is linked with hospital decision makers (administrators, researchers and clinicians) as well as insurance companies and pharmaceutical companies. It is built on a database that has been optimized for analytical processing. By separating decision support queries from the transaction processing tasks of operational systems, users can perform analytical functions without interfering with critical processing activities in the primary systems. Moreover, analytical users have access to a broader information view and can analyze trends and patterns, perform drill-downs and compare information on data that has been collected throughout the invention network.

To streamline management of the large quantity of data collected, the data warehouse incorporates special indexing and structural features. Unlike operational or transactional databases that are the focal point of day-to-day business activities, the data warehouse stores information from multiple information systems. The database can be any type, but the most commonly used are relational databases that have been optimized for data warehouses.

The benefits of warehousing clinical data are numerous. These benefits include more effective case, disease, and cost management, easier access to data on an *ad hoc* basis, and more effective treatment analysis. While current healthcare systems have vast quantities of data, they do not have a mechanism to combine this data and transform it into information that can be analyzed by hospital administrators, researchers and clinicians, as well as insurance and pharmaceutical companies.

Another advantage of the data warehouse of the invention is that it stores data spanning an entire patient encounter and potentially beyond the encounter to include treatment and prescription data. This data allows clinicians to manage patients more effectively. For example, it can show a patient a prescription and whether or not all refills were prescribed.

FIG. 9 exemplifies the overall network of the invention, including its broad geographic scope. As shown in FIG. 9, a radiologist (Step 8500) and referring physicians (Step 8600) communicate with a San Francisco - based Media Distribution Center (Step 8700) via a local DSL network (Step 8800). Another radiologist (Step 8900) and referring physicians (Step 9000) communicate with a Baltimore - based Media Distribution Center (Step 9100) via a local DSL network (Step 9200). In turn, both the San Francisco and Baltimore Media Distribution Centers communicate with each other as well as a Tulsa Media Distribution Center (Step 9300). The invention contemplates similar networking throughout the United States, continental America and global networking, such that a plurality of physicians and diagnostic service centers in these regions are able to participate in the invention.

Although illustrative preferred embodiments have been described herein in detail, it should be noted and will be appreciated by those skilled in the art that numerous variations may be made within the scope of the invention without departing from the principle of the invention and without sacrificing its chief advantages. The terms and expressions have been used as terms of description and not terms of limitation. There is no intention to use the terms or expressions to exclude any equivalents of features shown and described or portions thereof and the invention should be defined with the claims which follow.

**IN THE CLAIMS:**

1. A method for communicating a medical diagnosis and a recommended pharmaceutical treatment to a physician, comprising:
  - storing a plurality of pharmaceutical treatments in a database of a Media Distribution Center;
  - transmitting a coded diagnosis to said Media Distribution Center based on the results of a patient encounter at a diagnostic service center;
  - selecting at least one recommended pharmaceutical treatment which corresponds to said coded diagnosis based on a lookup by said Media Distribution Center of said plurality of pharmaceutical treatments; and
  - transmitting said coded diagnosis and said recommended pharmaceutical treatment to said physician.
2. The method of claim 1, further comprising displaying said coded diagnosis and said recommended pharmaceutical treatment transmitted to said physician on a first web page.
3. The method of claim 2, further comprising displaying more detailed information concerning said recommended pharmaceutical treatment on a second web page linked to said first web page.
4. The method of claim 3, wherein said more detailed information includes clinical data relating to said recommended pharmaceutical treatment.
5. The method of claim 2, further comprising selecting said recommended pharmaceutical treatment and preparing a prescription for said patient.
6. The method of claim 5, further comprising transmitting said prescription to said Media Distribution Center.
7. The method of claim 6, further comprising storing a patient encounter record including said coded diagnosis and said prescription in said Media Distribution Center.
8. The method of claim 7, further comprising transmitting said patient record for analysis by a pharmaceutical company, insurance company, hospital administrator, researcher and/or clinician.
9. The method of claim 1, further comprising selecting an alternative code for said diagnosis.
10. The method of claim 9, further comprising selecting at least one

recommended pharmaceutical treatment which corresponds to said alternative code diagnosis based on a lookup by said Media Distribution Center of said plurality of pharmaceutical treatments.

11. The method of claim 10, further comprising transmitting said alternative code diagnosis and said recommended pharmaceutical treatment to said physician.

12. The method of claim 1, further comprising displaying said coded diagnosis transmitted to said physician on a first web page and displaying said recommended pharmaceutical treatment on a second web page linked to said first web page.

13. The method of claim 1, wherein said coded diagnosis includes at least one diagnostic image.

14. The method of claim 1, wherein said physician conducts a preliminary diagnosis of said patient and communicates said preliminary diagnosis to said diagnostic service center.

15. The method of claim 1, further comprising notifying said physician of the completion of said diagnosis by said diagnostic service center.

16. The method of claim 15, wherein said notification is by e-mail.

17. A method for communicating a medical diagnosis and a recommended pharmaceutical treatment, comprising:

storing a plurality of pharmaceutical treatments;

transmitting a coded diagnosis;

selecting at least one recommended pharmaceutical treatment from said plurality of pharmaceutical treatments which corresponds to said coded diagnosis; and

transmitting said coded diagnosis and said recommended pharmaceutical treatment to an individual.

18. The method of claim 17, further comprising displaying said coded diagnosis and said recommended pharmaceutical treatment transmitted to said individual on a first web page.

19. The method of claim 18, further comprising displaying more detailed information concerning said recommended pharmaceutical treatment on a second web page linked to said first web page.

20. The method of claim 19, wherein said more detailed information includes clinical data relating to said recommended pharmaceutical treatment.

21. The method of claim 18, further comprising selecting said recommended pharmaceutical treatment and preparing a prescription for a patient.

22. The method of claim 21, further comprising transmitting said prescription to a Media Distribution Center.

23. The method of claim 22, further comprising storing a patient encounter record including said coded diagnosis and said prescription in said Media Distribution Center.

24. The method of claim 23, further comprising transmitting a patient record including said coded diagnosis and said prescription for analysis by a pharmaceutical company, insurance company, hospital administrator, researcher and/or clinician.

25. The method of claim 17, further comprising selecting an alternative code for said diagnosis.

26. The method of claim 25, further comprising selecting at least one recommended pharmaceutical treatment which corresponds to said alternative code diagnosis.

27. The method of claim 26, further comprising transmitting said alternative code patient diagnosis and said recommended pharmaceutical treatment to said individual.

28. The method of claim 17, further comprising displaying said coded diagnosis transmitted to said individual on a first web page and displaying said recommended pharmaceutical treatment on a second web page linked to said first web page.

29. A system for communicating a medical diagnosis and recommended pharmaceutical treatment, comprising:

at least one diagnostic service center for transmitting a coded diagnosis based on the results of a patient encounter;

at least one Media Distribution Center containing a database which stores a plurality of pharmaceutical treatments, wherein said Media Distribution Center (a) receives said coded diagnosis and (b) selects at least one recommended pharmaceutical treatment corresponding to said coded

diagnosis based on a lookup of said plurality of pharmaceutical treatments;  
and

at least one physician who receives from said Media Distribution Center said coded diagnosis and said recommended pharmaceutical treatment.

30. The system of claim 29, wherein said coded diagnosis and said recommended pharmaceutical treatment are displayed on a first web page.

31. The system of claim 30, wherein more detailed information concerning said recommended pharmaceutical treatment is displayed on a second web page linked to said first web page.

32. The system of claim 31, wherein said more detailed information includes clinical data relating to said recommended pharmaceutical treatment.

33. The system of claim 29, wherein said coded diagnosis is displayed on a first web page and said recommended pharmaceutical treatment is displayed on a second web page linked to said first web page.

34. The system of claim 29, wherein said physician selects a recommended pharmaceutical treatment for said coded diagnosis and prepares a prescription for a patient.

35. The system of claim 34, wherein said physician transmits said prescription to said Media Distribution Center.

36. The system of claim 35, wherein a patient record including said coded diagnosis and said prescription is stored by said Media Distribution Center.

37. The system of claim 36, wherein said patient record is transmitted for analysis by a pharmaceutical company, insurance company, hospital administrator, researcher and/or clinician.

38. The system of claim 29, wherein said physician selects an alternative code for said diagnosis.

39. The system of claim 38, wherein said Media Distribution Center selects at least one recommended pharmaceutical treatment corresponding to said alternative code diagnosis based on a lookup of said plurality of pharmaceuticals treatments.

40. The system of claim 39, wherein said alternative code diagnosis and said recommended pharmaceutical treatment are received by said

physician.

41. The system of claim 29, wherein said physician conducts a preliminary diagnosis for a patient and communicates said preliminary diagnosis to said diagnostic service center.

42. The system of claim 29, wherein said diagnostic service center notifies said physician of the completion of a patient diagnosis.

43. The system of claim 42, wherein said notification is by e-mail.

44. The system of claim 29, wherein said coded diagnosis includes at least one diagnostic image.

45. A method for using a computer to select a recommended pharmaceutical treatment for a medical diagnosis, comprising:

storing a plurality of pharmaceutical treatments in a database;

receiving a coded diagnosis for a patient encounter;

selecting at least one recommended pharmaceutical treatment corresponding to said coded diagnosis based on a lookup of said plurality of pharmaceutical treatments.

46. The method of claim 45, wherein said coded diagnosis includes at least one diagnostic image.

47. The method of claim 45, further comprising receiving an alternative code for said diagnosis and selecting at least one recommended pharmaceutical treatment corresponding to said alternative code diagnosis based on a lookup of said plurality of pharmaceutical treatments.

48. A method for using a computer to transmit a coded medical diagnosis and a recommended pharmaceutical treatment, comprising:

storing a plurality of pharmaceutical treatments in a database;

receiving a coded diagnosis for a patient encounter;

selecting at least one recommended pharmaceutical treatment corresponding to said coded diagnosis based on a lookup of said plurality of pharmaceutical treatments; and

transmitting said coded diagnosis and said recommended pharmaceutical treatment to an individual.

49. The method of claim 48, wherein said coded diagnosis includes at least one diagnostic image.



50. The method of claim 48, further comprising receiving an alternative code for said diagnosis and selecting at least one recommended pharmaceutical treatment corresponding to said alternative code diagnosis based on a lookup of said plurality of pharmaceutical treatments.

51. The method of claim 48, wherein said coded diagnosis and said recommended pharmaceutical treatment are transmitted for display on a first web page.

52. The method of claim 48, wherein said coded diagnosis is transmitted for display on a first web page and said recommended pharmaceutical treatment is transmitted for display on a second web page linked to said first web page.

53. A method for using a computer to display a medical diagnosis and a recommended pharmaceutical treatment, comprising:

storing a coded diagnosis corresponding to a patient encounter and at least one recommended pharmaceutical treatment;

inputting information identifying said patient encounter; and

displaying said coded diagnosis and at least one recommended pharmaceutical treatment corresponding to said patient encounter.

54. The method of claim 53, wherein said coded diagnosis and said recommended pharmaceutical treatment are displayed on a first web page.

55. The method of claim 54, further comprising displaying more detailed information concerning said recommended pharmaceutical treatment on a second web page linked to said first web page.

56. The method of claim 55, wherein said more detailed information includes clinical data relating to said recommended pharmaceutical treatment.

57. The method of claim 53, wherein said coded diagnosis is displayed on a first web page and said recommended pharmaceutical treatment is displayed on a second web page.

58. The method of claim 53, wherein said coded diagnosis includes at least one diagnostic image.

59. A method for using a computer to display a medical diagnosis and a recommended pharmaceutical treatment, comprising:

inputting information identifying a patient encounter;

receiving a coded diagnosis corresponding to said patient encounter and at least one recommended pharmaceutical treatment; and displaying said coded diagnosis and at least one recommended pharmaceutical treatment corresponding to said patient encounter.

60. The method of claim 59, wherein said coded diagnosis and said recommended pharmaceutical treatment are displayed on a first web page.

61. The method of claim 60, further comprising displaying more detailed information concerning said recommended pharmaceutical treatment on a second web page linked to said first web page.

62. The method of claim 61, wherein said more detailed information includes clinical data relating to said recommended pharmaceutical treatment.

63. The method of claim 59, wherein said coded diagnosis is displayed on a first web page and said recommended pharmaceutical treatment is displayed on a second web page.

64. The method of claim 59, wherein said coded diagnosis includes at least one diagnostic image.

65. An apparatus for selecting a recommended pharmaceutical treatment for a medical diagnosis, comprising:

a database for storing a plurality of pharmaceutical treatments;

a storage device; and

a processor connected to the storage device,

the storage device storing

a program for controlling the processor; and

the processor operative with the program to,

(1) receive a coded diagnosis for a patient encounter;

(2) select at least one recommended pharmaceutical treatment corresponding to said coded diagnosis based on a lookup of said plurality of pharmaceutical treatments.

66. The apparatus of claim 65, wherein said coded diagnosis includes at least one diagnostic image.

67. The apparatus of claim 65, wherein an alternative code for said diagnosis is received.

68. The apparatus of claim 67, wherein said processor selects at

least one recommended pharmaceutical treatment corresponding to said alternative code diagnosis based on a lookup of said plurality of pharmaceutical treatments.

69. A computer device for transmitting a coded medical diagnosis and a recommended pharmaceutical treatment, comprising:

a storage device; and

a processor connected to said storage device,

the storage device storing

a program for controlling the processor; and

the processor operative with the program to,

(1) receive a coded diagnosis and at least one recommended pharmaceutical treatment corresponding to said coded diagnosis; and

(2) transmit said coded diagnosis and said recommended pharmaceutical treatment to an individual.

70. The computer device of claim 69, wherein said coded diagnosis includes at least one diagnostic image.

71. The computer device of claim 69, wherein an alternative code for said diagnosis is received and at least one recommended pharmaceutical treatment corresponding to said alternative code diagnosis is selected.

72. The computer device of claim 69, wherein said coded diagnosis and said recommended pharmaceutical treatment are transmitted for display on a first web page.

73. The computer device of claim 69, wherein said coded diagnosis is transmitted for display on a first web page and said recommended pharmaceutical treatment is transmitted for display on a second web page linked to said first web page.

74. An apparatus for displaying a medical diagnosis and a recommended pharmaceutical treatment, comprising:

a storage device; and

a processor connected to the storage device,

the storage device storing

a program for controlling the processor; and

the processor operative with the program to,

- (1) receive information identifying a patient encounter; and
- (2) display a coded diagnosis and at least one recommended pharmaceutical treatment corresponding to said patient encounter.

75. The apparatus of claim 74, wherein said coded diagnosis and said recommended pharmaceutical treatment are displayed on a first web page.

76. The apparatus of claim 75, wherein more detailed information concerning said recommended pharmaceutical treatment is displayed on a second web page linked to said single web page.

77. The apparatus of claim 76, wherein said more detailed information includes clinical data relating to said recommended pharmaceutical treatment.

78. The apparatus of claim 74, wherein said coded diagnosis is displayed on a first web page and said recommended pharmaceutical treatment is displayed on a second web page linked to said first web page.

79. A computer readable medium having computer executable software code stored thereon to select a recommended pharmaceutical treatment for a medical diagnosis, comprising:

code for storing a plurality of pharmaceuticals treatments;  
code for receiving a coded diagnosis for a patient encounter; and  
code for selecting at least one recommended pharmaceutical treatment corresponding to said coded diagnosis based on a lookup of said plurality of pharmaceutical treatments.

80. The computer readable medium of claim 79, wherein said coded diagnosis includes at least one diagnostic image.

81. The computer readable medium of claim 79, further comprising code for receiving an alternative code for said diagnosis.

82. The computer readable medium of claim 81, further comprising code for selecting at least one recommended pharmaceutical treatment corresponding to said alternative code diagnosis based on a lookup of said plurality of pharmaceutical treatments.

83. A computer readable medium having computer executable software code stored thereon to transmit a coded medical diagnosis and a

recommended pharmaceutical treatment, comprising:

- code for storing a plurality of pharmaceutical treatments in a database;
- code for receiving a coded diagnosis for a patient encounter;
- code for selecting at least one recommended pharmaceutical treatment corresponding to said coded diagnosis based on a lookup of said plurality of pharmaceutical treatments; and
- code for transmitting said coded diagnosis and said recommended pharmaceutical treatment.

84. The computer readable medium of claim 83, wherein said coded diagnosis includes at least one diagnostic image.

85. The computer readable medium of claim 83, wherein said coded diagnosis and said recommended pharmaceutical treatment is transmitted for display on a first web page.

86. The computer readable medium of claim 83, wherein said coded diagnosis is transmitted for display on a first web page and said recommended pharmaceutical treatment is transmitted for display on a second web page linked to said first web page.

87. A computer readable medium having computer executable software code stored thereon to display a medical diagnosis and a recommended pharmaceutical treatment, comprising:

- code for storing a coded diagnosis and at least one recommended pharmaceutical treatment corresponding to a patient encounter;
- code for receiving information identifying a patient encounter; and
- code for displaying a coded diagnosis and said recommended pharmaceutical treatment.

88. The computer readable medium of claim 87, wherein said coded diagnosis and said recommended pharmaceutical treatment are displayed on a first web page.

89. The computer readable medium of claim 88, further comprising code for displaying more detailed information concerning said recommended pharmaceutical treatment on a second web page linked to said first web page.

90. The computer readable medium of claim 88, wherein said more detailed information includes clinical data concerning said recommended

pharmaceutical treatment.

91. The computer readable medium of claim 87, wherein said coded diagnosis is displayed on a first web page and said recommended pharmaceutical treatment is displayed on a second web page linked to said first web page.

92. The computer readable medium of claim 87, wherein said coded diagnosis includes at least one diagnostic image.

93. A computer readable medium having computer executable software code stored thereon to display a medical diagnosis and a recommended pharmaceutical treatment, comprising:

code for receiving information identifying a patient encounter;  
code for receiving a coded diagnosis corresponding to said patient encounter and at least one recommended pharmaceutical treatment; and  
code for displaying said coded diagnosis and at least one recommended pharmaceutical treatment corresponding to said patient encounter.

94. The computer readable medium of claim 93, wherein said coded diagnosis and said recommended pharmaceutical treatment are displayed on a first web page.

95. The computer readable medium of claim 94, further comprising code for displaying more detailed information concerning said recommended pharmaceutical treatment on a second web page linked to said first web page.

96. The computer readable medium of claim 95, wherein said more detailed information includes clinical data concerning said recommended pharmaceutical treatment.

97. The computer readable medium of claim 93, wherein said coded diagnosis is displayed on a first web page and said recommended pharmaceutical treatment is displayed on a second web page linked to said first web page.

98. The computer readable medium of claim 93, wherein said coded diagnosis includes at least one diagnostic image.

99. A computer device for transmitting a coded medical diagnosis, comprising:

a storage device; and  
a processor connected to the storage device,  
the storage device storing  
a program for controlling the processor; and the processor  
operative with the program to,

- (1) receive a coded diagnosis for a patient encounter, and
- (2) transmit said coded diagnosis to a Media Distribution Center, wherein said Media Distribution Center selects at least one recommended pharmaceutical treatment corresponding to said coded diagnosis based on a lookup of a plurality of pharmaceutical treatments.

100. The computer device of claim 99, wherein said coded diagnosis includes at least one diagnostic image.

101. The computer device of claim 99, wherein said diagnostic image is interfaced with patient encounter and diagnosis information.

102. The computer device of claim 99, wherein said coded diagnosis is transmitted to said Media Distribution Center using a DICOM to web gateway.

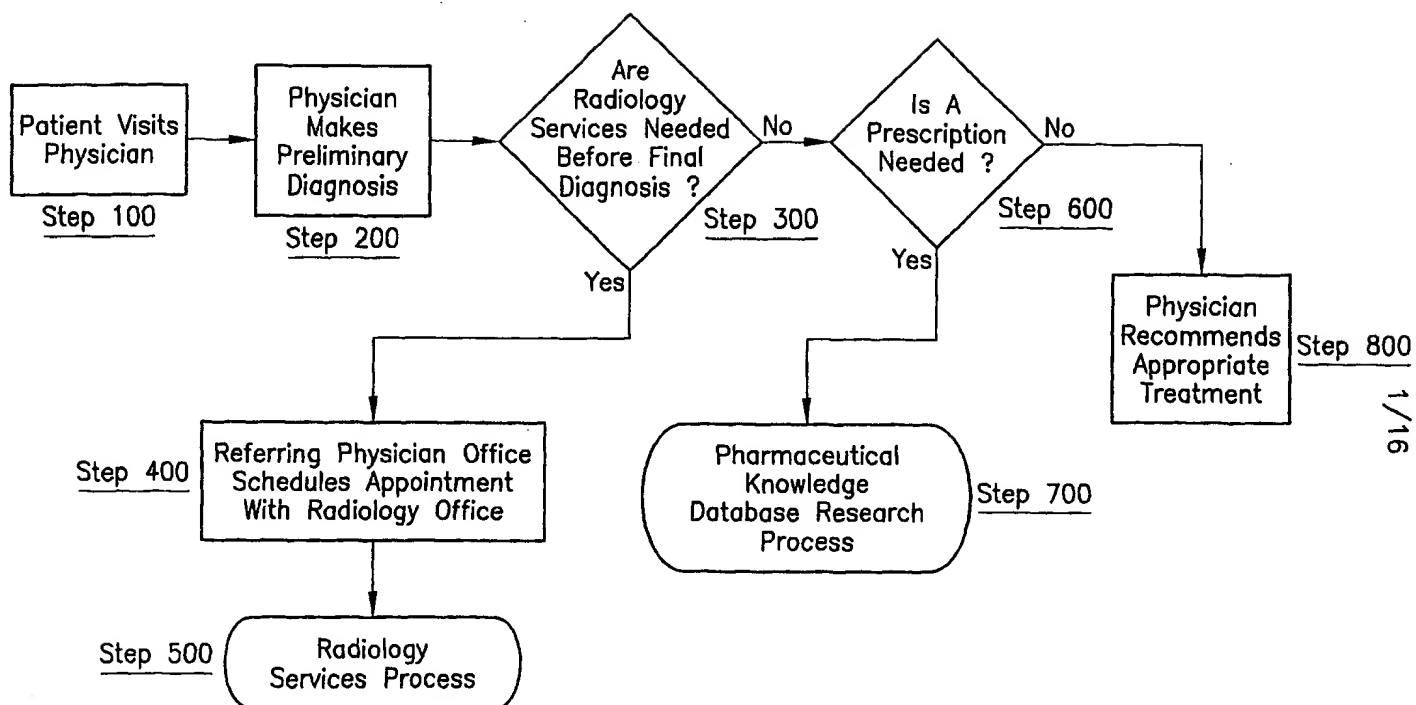


Fig. 1



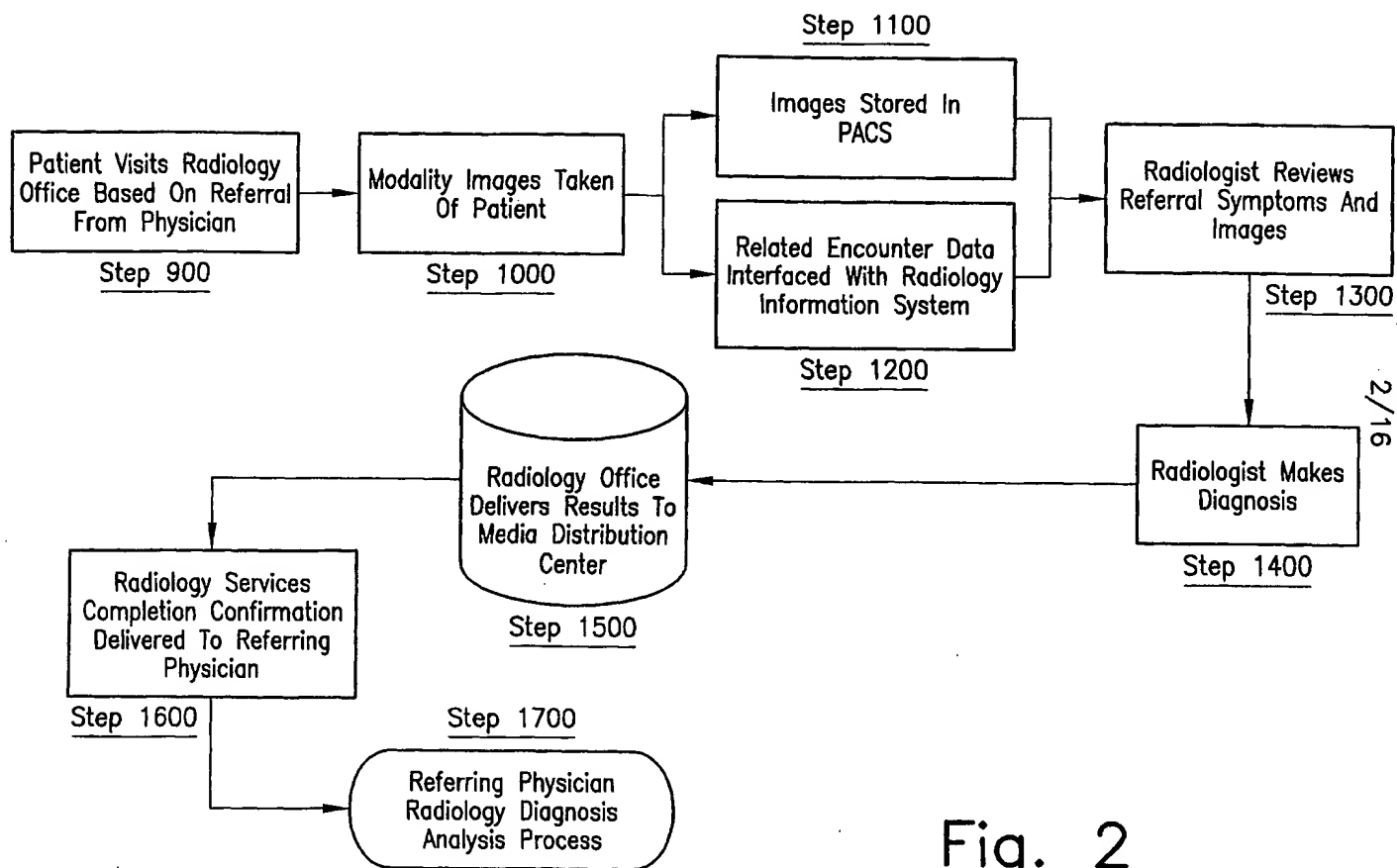


Fig. 2

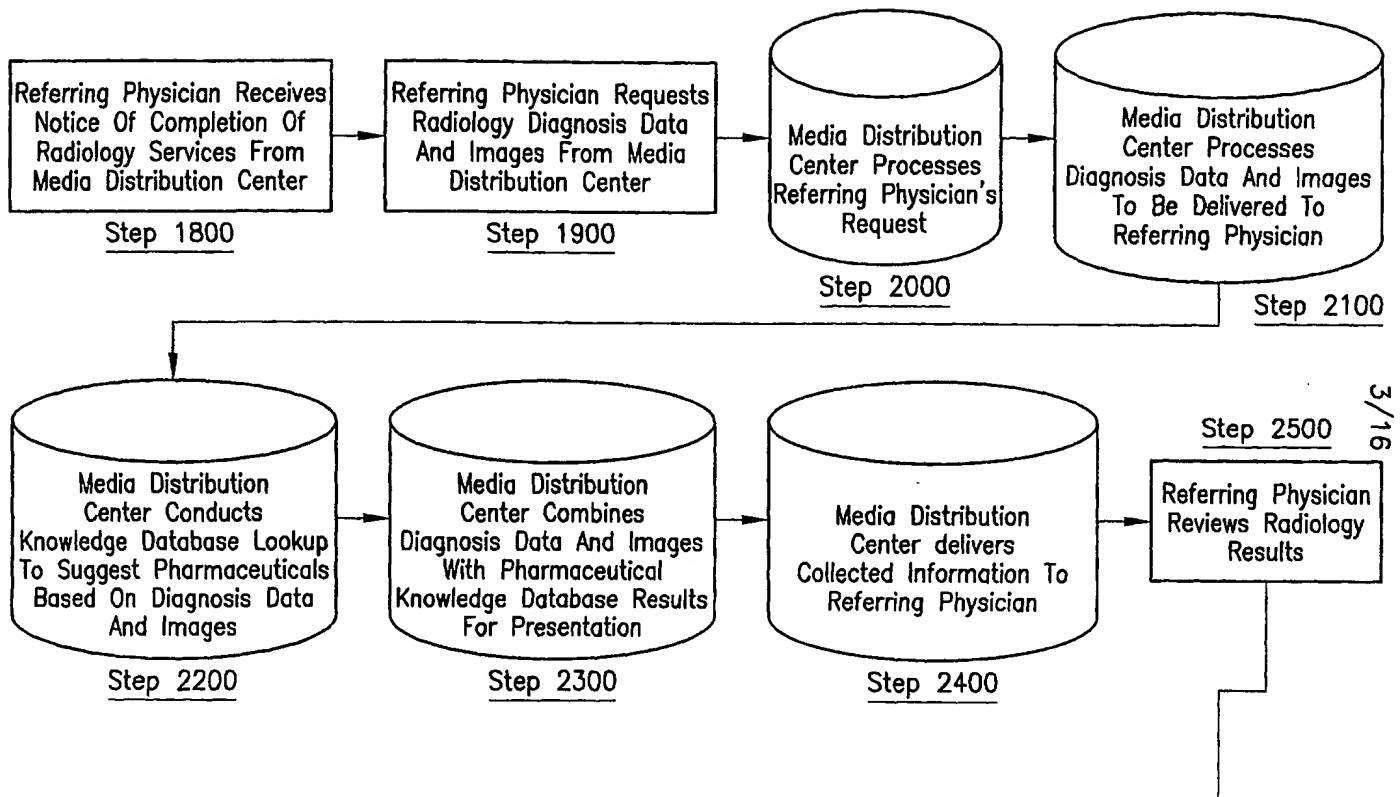
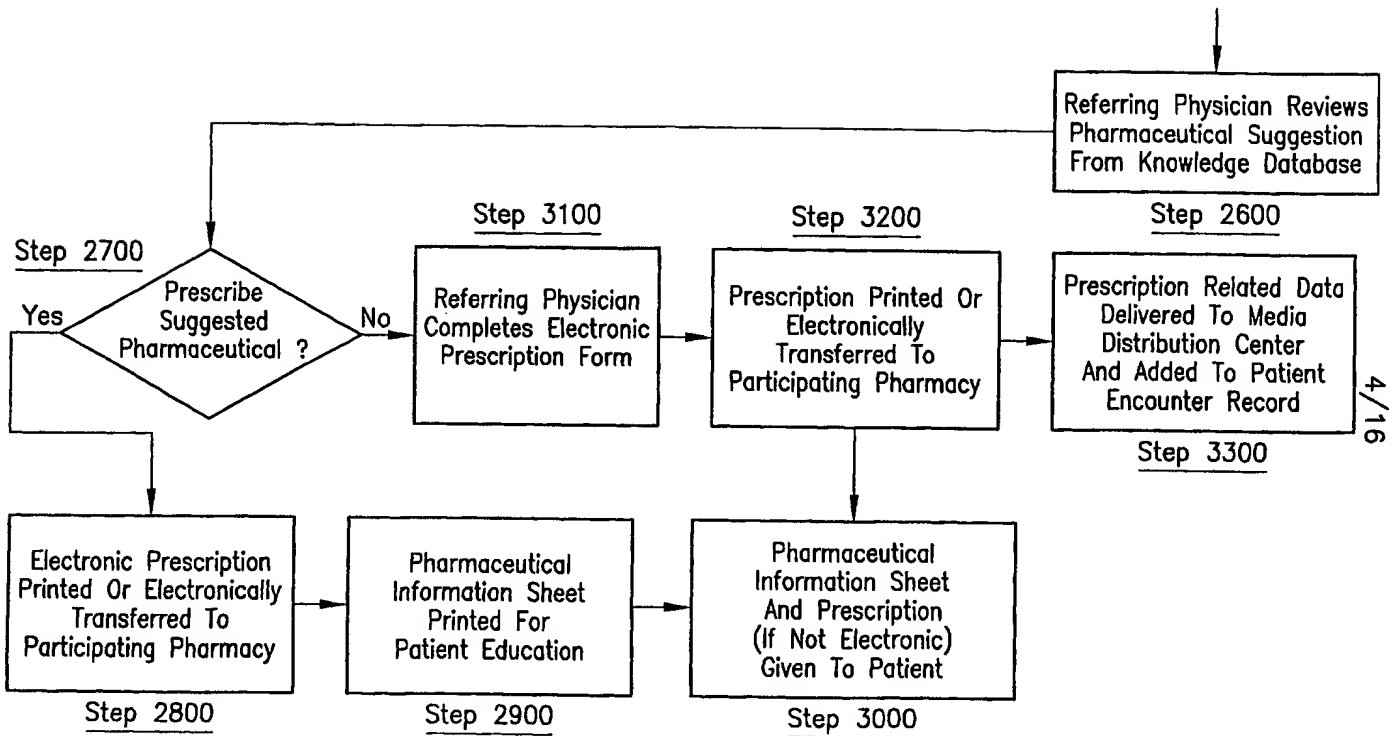


Fig. 3a



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Fig. 3b

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January 24, 2000

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#### Image Navigation

- ☐ John Doe
- ☐ Chest
  - ☐ Frontal View
  - ☐ Side\_View=Left
  - ☐ Side\_View=Right
  - ☐ Back\_View
- ☐ Left Shoulder
- ☐ Right Shoulder

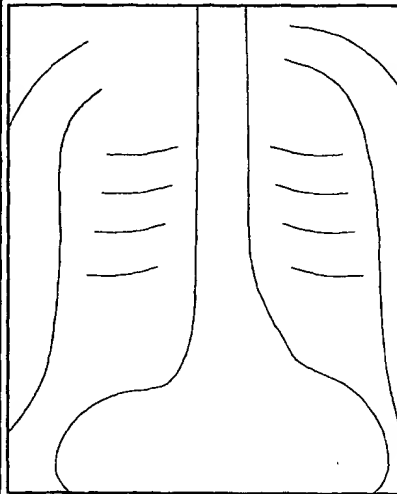
Advertisement  
will be placed here

#### Current View

##### CHEST - FRONTAL

###### PATIENT INFORMATION

Patient: John Doe Sex: Male  
Birthdate: May-27-1961 SSN: 999-99-9999  
Encounter: 4351-254-89 Date Dec-12-1999  
Accession: 5458-4457



#### Appropriate Treatments

##### Capoten

Used to treat hypertension (high blood pressure), heart failure and kidney disease...

(More)

##### Capozide

Prevents certain enzymes in the body from constricting blood vessels. This helps to lower blood pressure and makes the heart beat stronger...

(More)

##### Capozide

Used to treat hypertension (high blood pressure), heart failure or help diabetics prevent kidney problems...used to treat hypertension (high blood pressure), heart failure or help diabetics prevent kidney problemsused to treat hypertension (high blood pressure), heart failure or help diabetics prevent kidney problems...

(More)

Fig. 4a.1

WO 01/65449

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## Radiologist Diagnosis and Notes

### CHEST X-RAY, PA AND LATERAL PROJECTIONS:

Marked cardiomegaly is noted. There are small bilateral pleural effusions present. The lungs have an ill-defined hazy appearance probably representing interstitial edema. Vascular congestion is present, consistent with CHF. No acute bone or soft tissue abnormalities are seen.

#### IMPRESSION:

Cardiomegaly and evidence of early CHF

#### ICD9:

429.3 Cardiomegaly  
428.0 Congestive Heart Failure

## Research Topics

Congestive Heart Failure Guide  
Congestive Heart Failure in the  
United States: A New Epidemic

Texas Medical Center Article on  
CHF

Boston University Article on  
CHF

## Strategic Partners



Bristol-Myers Squibb Company



Kodak ds  
digital science

RADIOLOGIX

MASTERMIND  
Internet Services

Fig. 4a.2

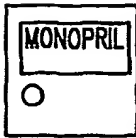
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## MONOPRIL

ACE INHIBITORS —  
ORAL

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Main Page



### Uses

ACE inhibitors prevent certain enzymes in the body from constricting blood vessels. This helps to lower blood pressure and make the heart beat stronger. This medication is used to treat hypertension (high blood pressure), heart failure or help diabetics prevent kidney problems.

### How to use

This medication may be taken without regards to meals. Take exactly as prescribed and try to take at the same time each day. Do not stop taken this medication without consulting your doctor. Some conditions may become worse when the drug is abruptly stopped. Your dose may need to be gradually decreased.

### Side Effects

10 mg 20 mg 40 mg  
Monopril

Headache, diarrhea, constipation, nausea, fatigue or dry cough may occur the first several days as your body adjusts to the medication. Unlikely but report promptly if you develop chest pain, tingling or swelling of the hands or feet; swelling of the face, lips or tongue; yellowing of the skin or eyes, fever, sore throat, or dizziness. In the unlikely event you have an allergic reaction to this drug, seek immediate medical attention. Symptoms of an allergic reaction include rash, itching, swelling, dizziness or trouble breathing. If you notice other effects not listed above, contact your doctor or pharmacist.

### Precautions

Before taking this drug tell your doctor your medical history especially a history of angioedema, high blood levels of potassium, kidney disease or kidney dialysis, salt restrictive diet, liver disease and of any allergies. Consult your doctor before using salt substitutes or low salt milk. to avoid dizziness and lightheadedness when rising from a seated or lying position, get up slowly. Limit your intake of alcohol and use caution when exercising or during hot weather as these can aggravate dizziness and lightheadedness. This medication should be used only when clearly needed during the first three months of pregnancy. It is not recommended during the last six months of a pregnancy. Discuss the risks and benefits with your doctor. This drug is excreted into breast milk. Consult your doctor before breast-feeding. Caution is advised when this medication is used in the elderly. Caution is advised when this medication is used in children.

### Interactions

Inform your doctor about all the medicine you use (both prescription and nonprescription) especially if you take lithium, potassium supplements, potassium sparing water pills or other water pills (diuretics), high blood pressure drugs or NSAID (aspirin-like drugs) because you may need to be monitored more closely. Avoid "stimulant" drugs that may increase your heart rate such as decongestants or caffeine. Decongestants are commonly found in over-the-counter cough-and -cold medicines. Do not start or stop any medicine without doctor or pharmacist approval.

### Notes

It is important to have your blood pressure checked regularly while taking this medication. Learn how to monitor your blood pressure. Discuss this with your doctor, lab tests may be performed periodically.

### Missed Dose

If you miss a dose, take as soon as remembered; do not take if it is almost time for your next dose, instead, skip the missed dose and resume your usual dosing schedule. Do not "double-up" the dose to catch up.

### Storage

Store at room temperature away from sunlight and moisture. Do not store in the

# Fig. 4b

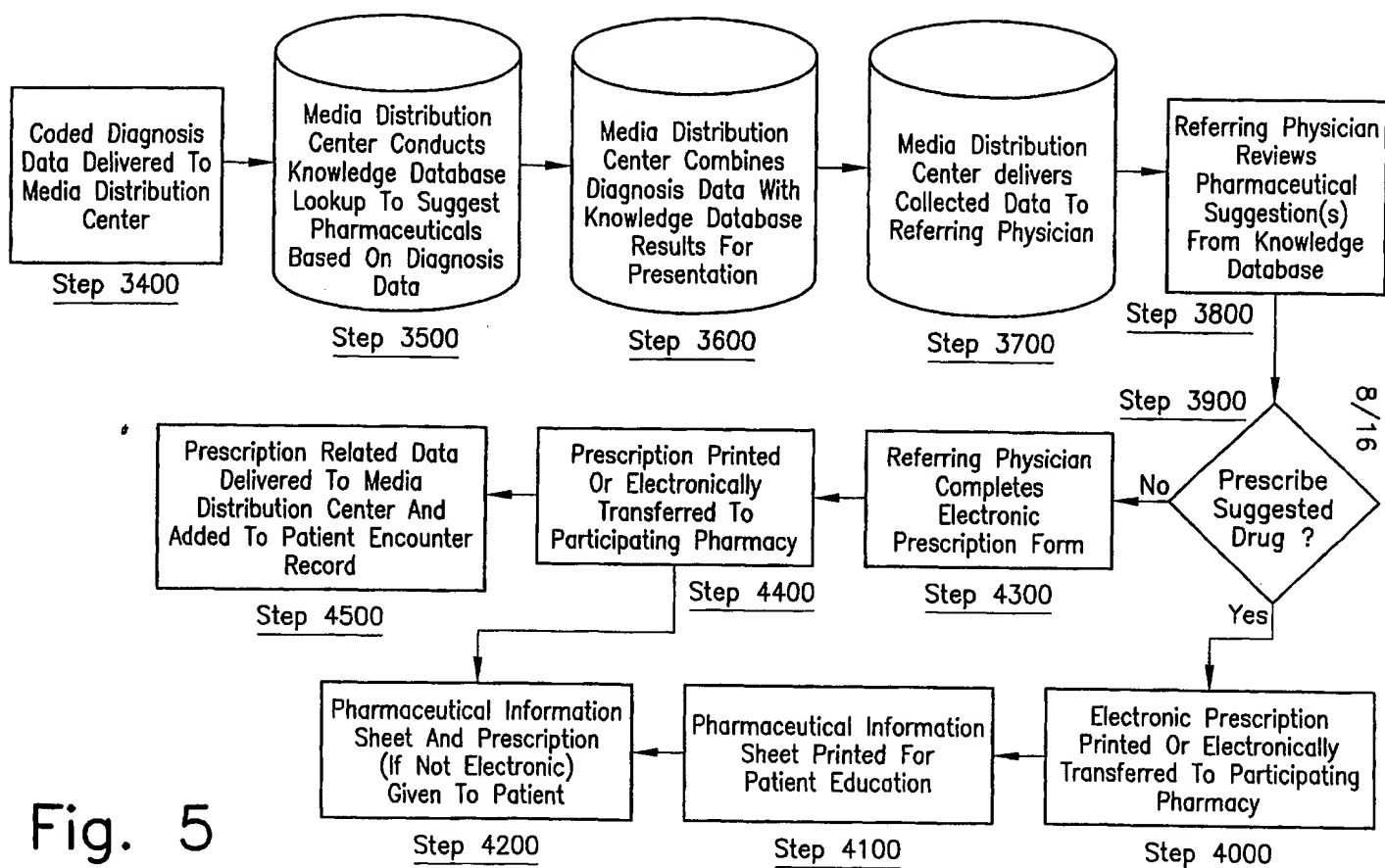


Fig. 5

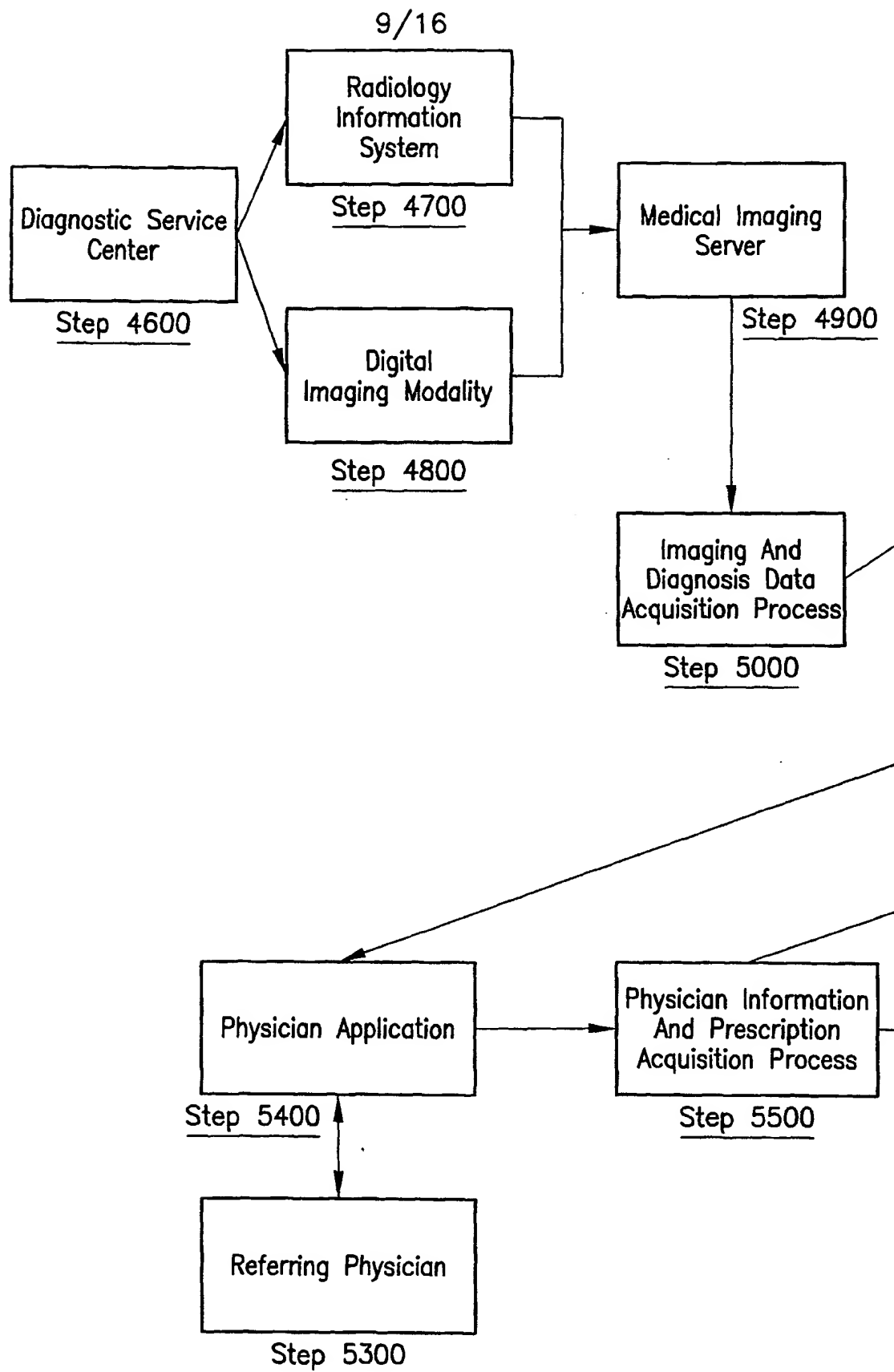


Fig. 6a



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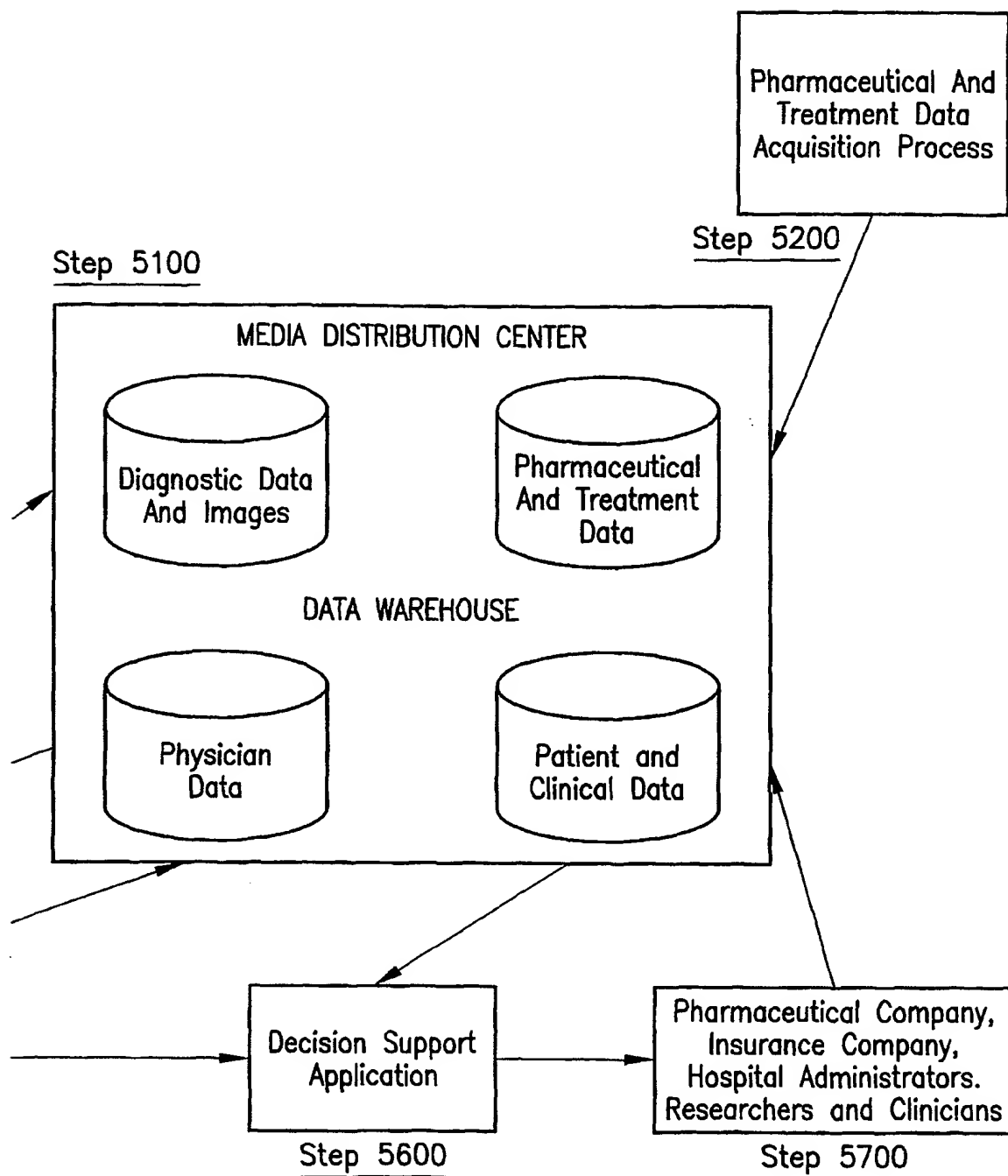


Fig. 6b

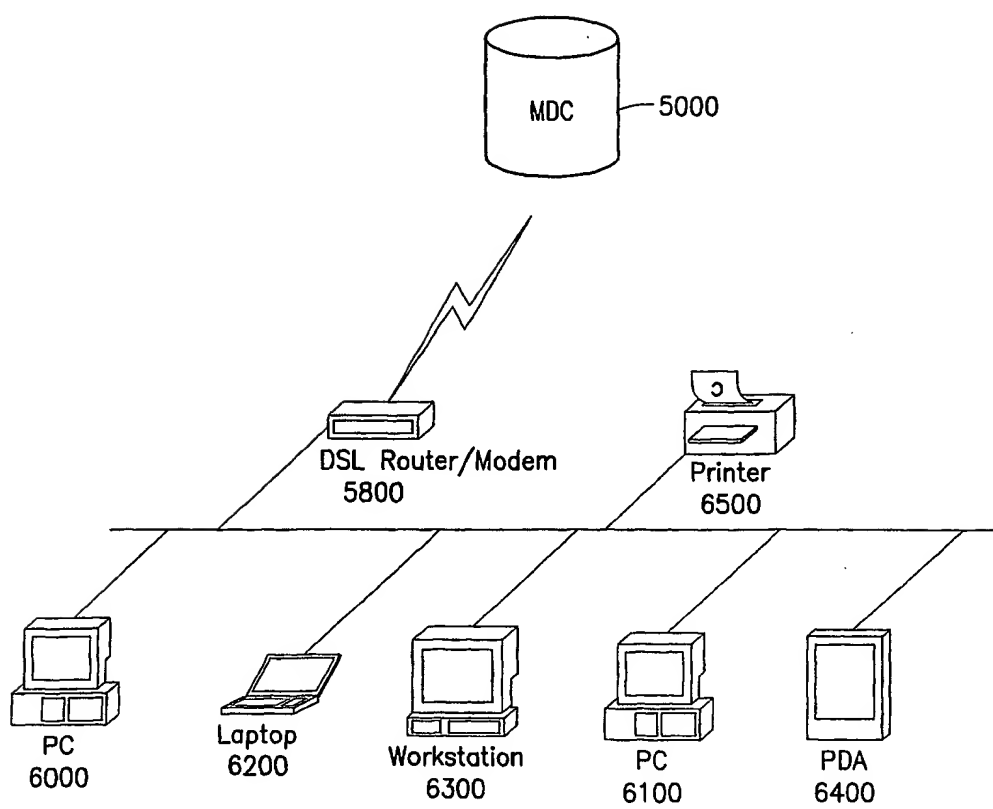


Fig. 7

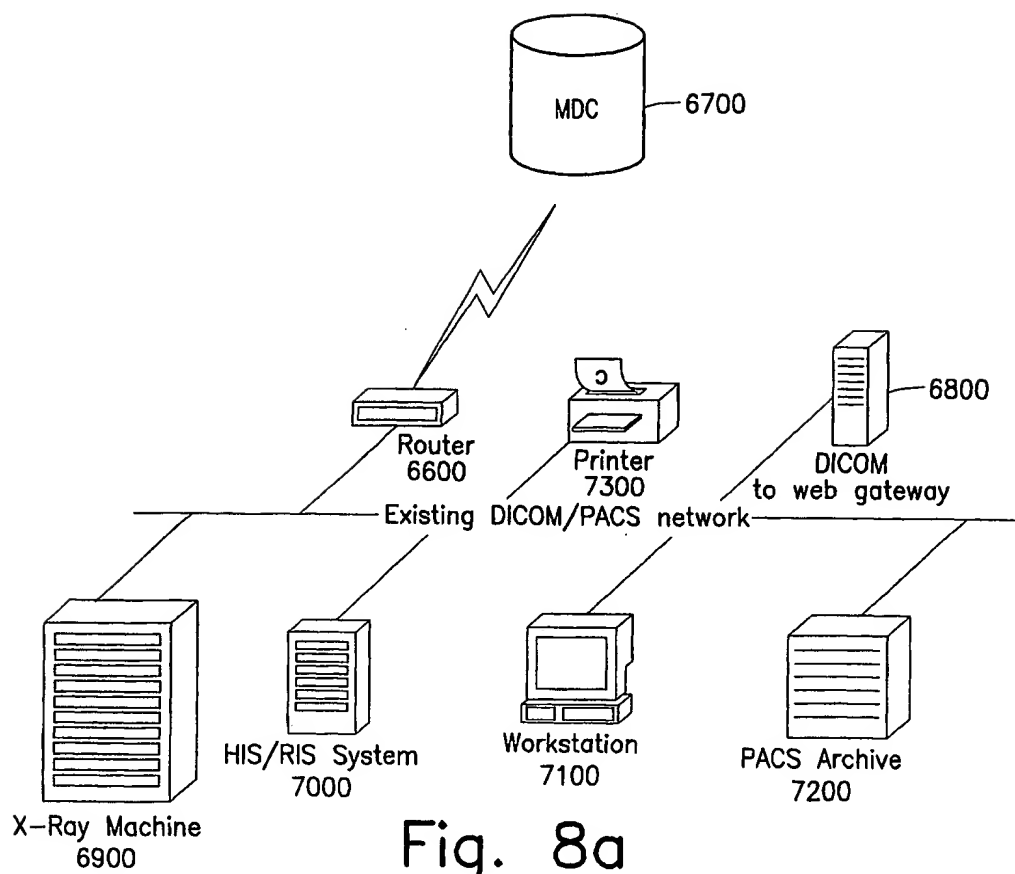


Fig. 8a

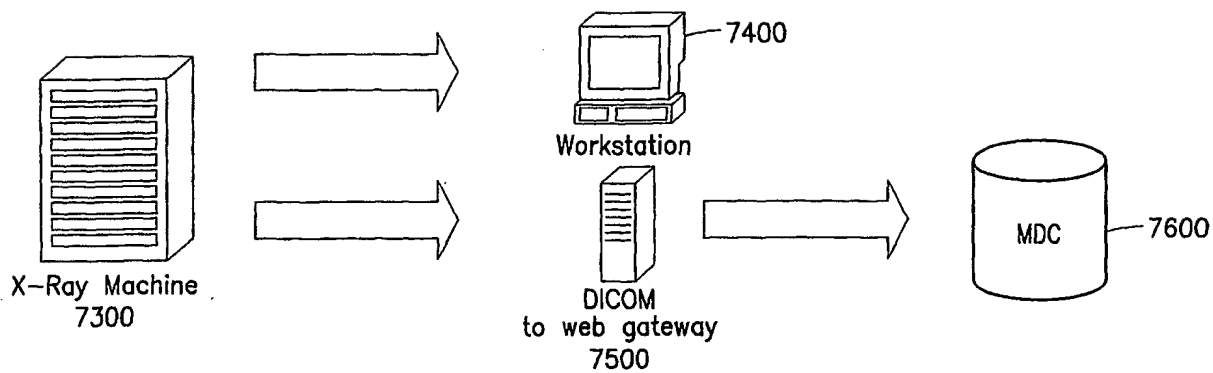


Fig. 8b

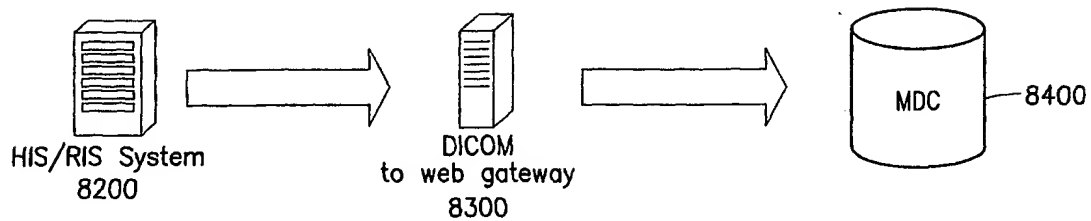


Fig. 8d

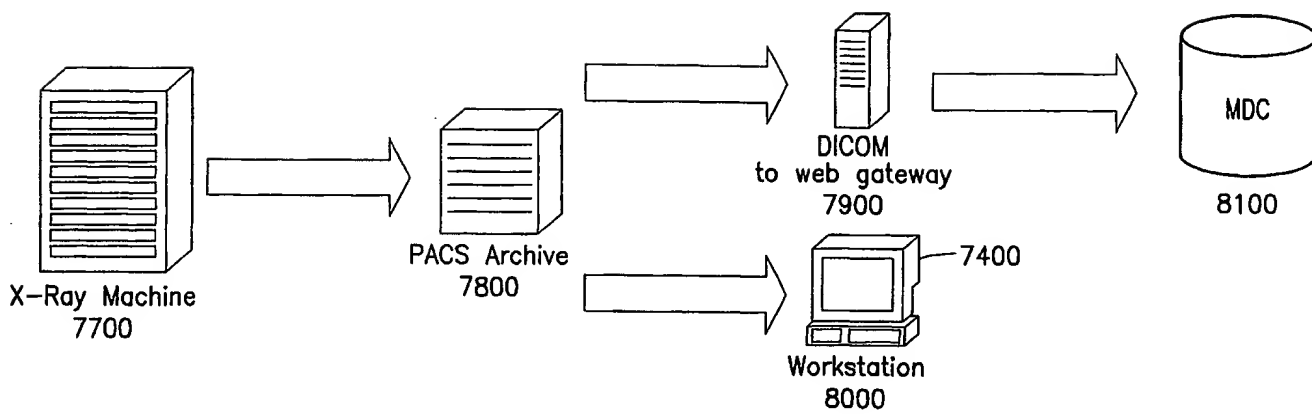


Fig. 8c

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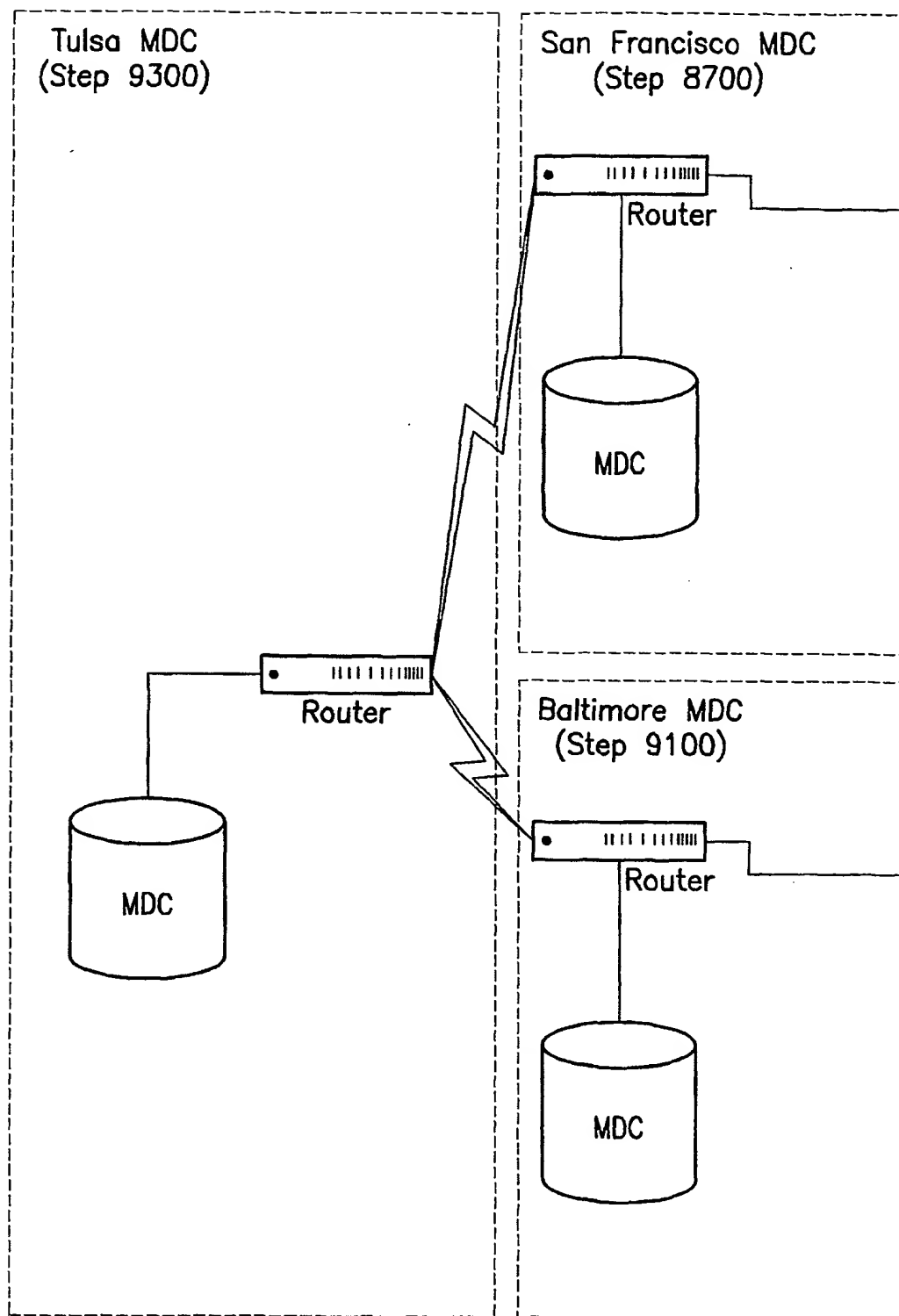


Fig. 9a

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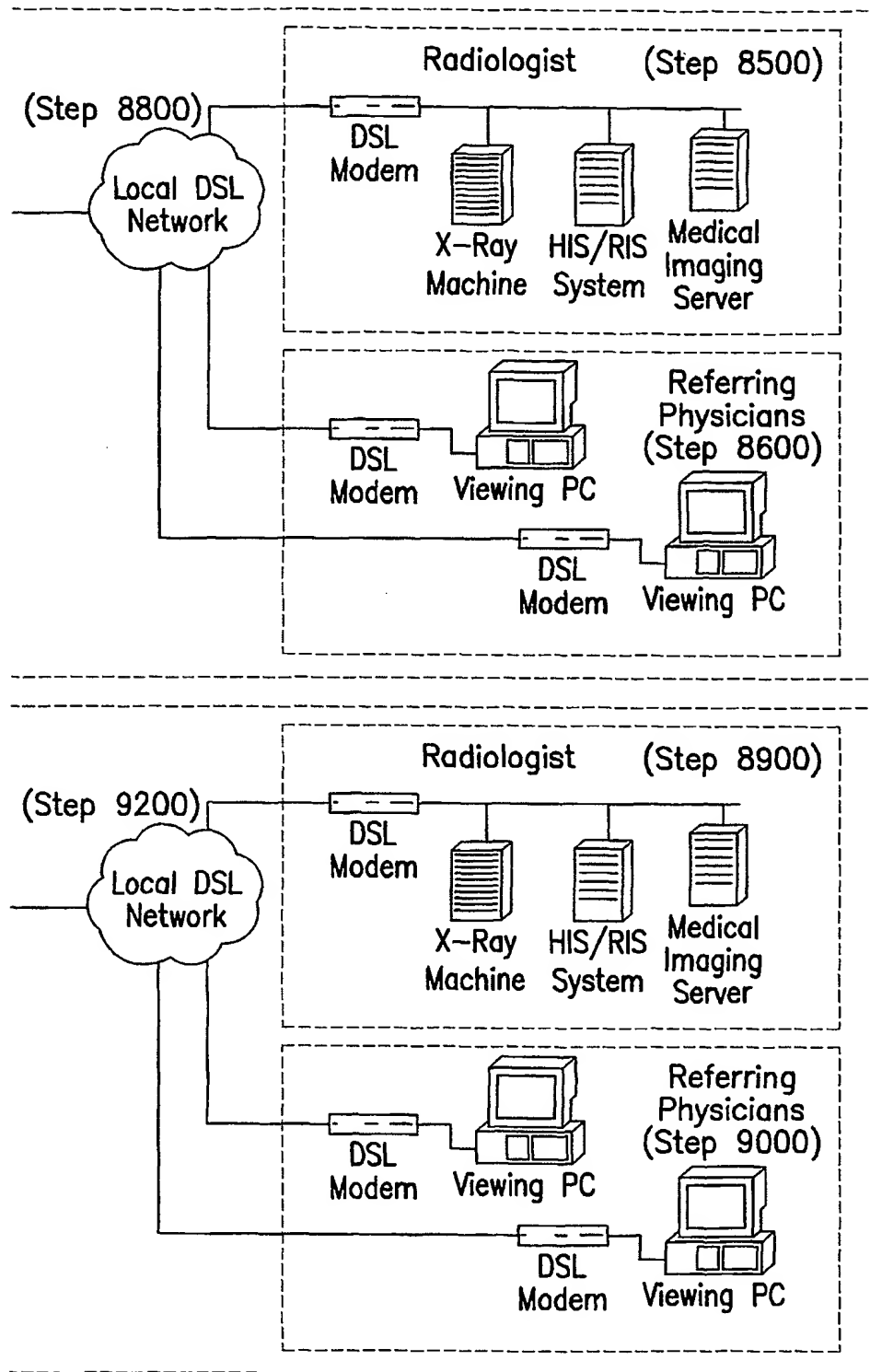


Fig. 9b

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/06529

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : G06F 17/60

US CL : 705/3

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
DIALOG, APS**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,924,074 A (EVANS) 13 July 1999 (13.07.1999), abstract, column 5, lines 1-8, 21-25, 46-55, column 7, lines 22-28, column 8, lines 61-67, column 9, lines 1-7, column 12, lines 56-60, column 13, lines 22-29, figure 20.	1-102

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Further documents are listed in the continuation of Box C.

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See patent family annex.

* Special categories of cited documents:	
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